

1 We claim:

- 1 1. A method to control access to logical volumes disposed in an information
2 storage and retrieval system using parallel access volumes, comprising the steps of:
3 providing an information storage and retrieval system comprising a plurality of
4 logical volumes;
5 providing a plurality of host computers, wherein each of said plurality of host
6 computers is capable of communicating with said information storage and retrieval
7 system;
8 forming (N) host computer groups, wherein (N) is greater than or equal to 1;
9 assigning each host computer to the a host computer group;
10 forming (N) logical volume groups;
11 assigning one or more of said plurality of logical volumes to a logical volume
12 group;
13 creating a parallel access volume having an alias;
14 persistently associating said parallel access volume with an original base logical
15 volume, wherein said original base logical volume is assigned to the (i)th logical volume
16 group, wherein (i) is greater than or equal to 1 and less than or equal to (N);
17 determining the current base logical volume associated with said parallel access
18 volume;
19 operative if said current base logical volume is said original base logical volume,
20 permitting each of said one or more host computers assigned to the (i)th host computer
21 group to access said original base logical volume;

22 operative if said current base logical volume is not said original base logical
23 volume, permitting each of said one or more host computers assigned to the (i)th host
24 computer group to access said current base logical volume.

1 2. The method of claim 1, further comprising the steps of:
2 requesting by one of said plurality of host computers to access a designated
3 logical volume;
4 determining that said requesting host computer is assigned to the (j)th host
5 computer group, wherein (j) is greater than or equal to 1 and less than or equal to (N);
6 determining if said designated logical volume is a parallel access volume;
7 operative if said designated logical volume is a parallel access volume,
8 determining the current base logical volume associated with said parallel access volume;
9 determining if said current base logical volume is assigned to the (j)th logical
10 volume group;
11 operative if said current base logical volume is assigned to the (j)th logical
12 volume group, permitting said requesting host to access said current base logical volume;
13 operative if said current base logical volume is not assigned to the (j)th logical
14 volume group, disallowing said requesting host from accessing said current base logical
15 volume.

1 3. The method of claim 1, further comprising the steps of:
2 receiving a request to reassign said alias to a different one of said plurality of
3 logical volumes;

4 determining if said different logical volume and said original base logical volume
5 are assigned to the same logical volume group;

6 operative if said different logical volume and said original base logical volume are
7 assigned to the same logical volume group, reassigning said alias to said different base
8 logical volume;

9 operative if said different logical volume and said original base logical volume are
10 not assigned to the same logical volume group, denying the request to assign the alias.

1 4. The method of claim 1, further comprising the steps of:
2 receiving a request to delete said alias;
3 deleting said alias.

1 5. The method of claim 1, further comprising the steps of:
2 receiving a request to assign said original base logical volume;
3 determining if the current base logical volume associated with said parallel access
4 volume differs from said original base logical volume;

5 operative if the current base logical volume does not differ from said original base
6 logical volume, assigning said original base volume;

7 operative if the current base logical volume differs from said original base logical
8 volume:

9 changing the current base logical volume to said original base logical volume; and
10 assigning said original base logical volume.

1 6. The method of claim 1, further comprising the steps of:
2 receiving a request to unassign the original base logical volume;

3 determining if the current base logical volume associated with said parallel access
4 volume differs from the original base logical volume;
5 operative if the current base logical volume does not differ from the original base
6 logical volume, unassigning the original base volume;
7 operative if the current base logical volume differs from the original base logical
8 volume:
9 changing the current base logical volume to the original base logical volume; and
10 unassigning said original base logical volume.

1 7. The method of claim 1, further comprising the steps of:
2 receiving a request to delete said original base logical volume;
3 deleting said alias and said original base logical volume.

1 8. The method of claim 1, further comprising the steps of:
2 receiving a request to assign the current base logical volume associated with said
3 parallel access volume;
4 determining if the current base logical volume differs from the original base
5 logical volume;
6 operative if the current base logical volume does not differ from the original base
7 logical volume, assigning the current base logical volume;
8 operative if the current base logical volume differs from the original base logical
9 volume:
10 reassigning said alias to said original base logical volume; and
11 assigning said current base logical volume.

1 9. The method of claim 1, further comprising the steps of:
2 receiving a request to unassign the current base logical volume associated with
3 said parallel access volume;
4 determining if the current base logical volume differs from the original base
5 logical volume;
6 operative if the current base logical volume does not differ from the original base
7 logical volume, unassigning the current base logical volume;
8 operative if the current base logical volume differs from the original base logical
9 volume:
10 reassigning said alias to said original base logical volume;
11 unassigning the current base logical volume.

1 10. The method of claim 1, further comprising the steps of:
2 receiving a request to delete the current base logical volume;
3 determining if the current base logical volume differs from the original base
4 logical volume;
5 operative if the current base logical volume does not differ from the original base
6 logical volume, deleting the current base logical volume;
7 operative if the current base logical volume differs from the original base logical
8 volume:
9 reassigning said alias to said original base logical volume;
10 deleting the current base logical volume.

1 11. An article of manufacture comprising a computer useable medium having
2 computer readable program code disposed therein to control access to logical volumes
3 disposed in an information storage and retrieval system using parallel access volumes,
4 wherein said information storage and retrieval system comprises a plurality of logical
5 volumes, and wherein a plurality of host computers are capable of communicating with
6 said information storage and retrieval system, the computer readable program code
7 comprising a series of computer readable program steps to effect:
8 receiving a request from one of said plurality of host computers to access a
9 designated logical volume, wherein said requesting host is assigned to the (j)th host
10 computer group;
11 determining if said designated logical volume is a parallel access volume
12 comprising an alias;
13 operative if said designated logical volume is a parallel access volume,
14 determining if the original base logical volume persistently associated with said parallel
15 access volume is assigned to the (j)th logical volume group;
16 operative if the original base logical volume persistently associated with said
17 parallel access volume is assigned to the (j)th logical volume group, determining if the
18 current base logical volume associated with said parallel access volume is said original
19 base logical volume;
20 operative if said current base logical volume is said original base logical volume,
21 permitting each of said one or more host computers assigned to the (j)th host computer
22 group to access said original base logical volume;

23 operative if said current base logical volume is not said original base logical
24 volume, permitting each of said one or more host computers assigned to the (j)th host
25 computer group to access said current base logical volume.

1 12. The article of manufacture of claim 11, wherein a first person owns said
2 requesting host computer, and wherein a second person owns said article of manufacture.

1 13. The article of manufacture of claim 11, said computer readable program
2 code further comprising a series of computer readable program steps to effect:

3 receiving a request to reassign said alias to a different one of said plurality of
4 logical volumes;

5 determining if said different logical volume and said original base logical volume
6 are assigned to the same logical volume group;

7 operative if said different logical volume and said original base logical volume are
8 assigned to the same logical volume group, reassigning said alias to said different base
9 logical volume;

10 operative if said different logical volume and said original base logical volume are
11 not assigned to the same logical volume group, denying the request to assign the alias.

1 14. The article of manufacture of claim 11, said computer readable program
2 code further comprising a series of computer readable program steps to effect:

3 receiving a request to delete said alias;

4 deleting said alias.

1 15. The article of manufacture of claim 11, said computer readable program
2 code further comprising a series of computer readable program steps to effect:

3 receiving a request to assign said original base logical volume;
4 determining if the current base logical volume associated with said parallel access
5 volume differs from said original base logical volume;
6 operative if the current base logical volume does not differ from said original base
7 logical volume, assigning said original base volume;
8 operative if the current base logical volume differs from said original base logical
9 volume:
10 changing the current base logical volume to said original base logical volume; and
11 assigning said original base logical volume.

1 16. The article of manufacture of claim 11, said computer readable program
2 code further comprising a series of computer readable program steps to effect:
3 receiving a request to unassign said original base logical volume;
4 determining if the current base logical volume associated with said parallel access
5 volume differs from said original base logical volume;
6 operative if the current base logical volume does not differ from the original base
7 logical volume, unassigning the original base volume;
8 operative if the current base logical volume differs from the original base logical
9 volume:
10 changing the current base logical volume to the original base logical volume; and
11 unassigning said original base logical volume.

1 17. The article of manufacture of claim 11, said computer readable program
2 code further comprising a series of computer readable program steps to effect:

3 receiving a request to delete said original base logical volume;
4 deleting said alias and said original base logical volume.

1 18. The article of manufacture of claim 11, said computer readable program
2 code further comprising a series of computer readable program steps to effect:

3 receiving a request to assign the current base logical volume associated with said
4 parallel access volume;

5 determining if the current base logical volume differs from the original base
6 logical volume;

7 operative if the current base logical volume does not differ from the original base
8 logical volume, assigning the current base logical volume;

9 operative if the current base logical volume differs from the original base logical
10 volume:

11 reassigning said alias to said original base logical volume; and

12 assigning said current base logical volume.

1 19. The article of manufacture of claim 11, said computer readable program
2 code further comprising a series of computer readable program steps to effect:

3 receiving a request to unassign the current base logical volume associated with
4 said parallel access volume;

5 determining if the current base logical volume differs from the original base
6 logical volume;

7 operative if the current base logical volume does not differ from the original base
8 logical volume, unassigning the current base logical volume;

9 operative if the current base logical volume differs from the original base logical
10 volume:

11 reassigning said alias to said original base logical volume;

12 unassigning the current base logical volume.

1 20. The article of manufacture of claim 11, said computer readable program
2 code further comprising a series of computer readable program steps to effect:

3 receiving a request to delete the current base logical volume associated with said
4 parallel access volume differs;

5 determining if the current base logical volume differs from the original base
6 logical volume;

7 operative if the current base logical volume does not differ from the original base
8 logical volume, deleting the current base logical volume;

9 operative if the current base logical volume differs from the original base logical
10 volume:

11 reassigning said alias to said original base logical volume;

12 deleting the current base logical volume.

1 21. A computer program product usable with a programmable computer
2 processor having computer readable program code embodied therein to control access to
3 logical volumes disposed in an information storage and retrieval system using parallel
4 access volumes, wherein said information storage and retrieval system comprises a
5 plurality of logical volumes, and wherein a plurality of host computers are capable of
6 communicating with said information storage and retrieval system, comprising:

7 computer readable program code which causes said programmable computer
8 processor to receive a request from one of said plurality of host computers to access a
9 designated logical volume, wherein said requesting host is assigned to the (j)th host
10 computer group;

11 computer readable program code which causes said programmable computer
12 processor to determine if said designated logical volume is a parallel access volume
13 comprising an alias, wherein said parallel access volume is persistently associated with
14 an original base logical volume, and wherein said plurality of logical volumes includes
15 said original base logical volume;

16 computer readable program code which, if said designated logical volume is a
17 parallel access volume, causes said programmable computer processor to determine the
18 current base logical volume for said parallel access volume;

19 computer readable program code which causes said programmable computer
20 processor to determine if said current base logical volume is assigned to the (j)th logical
21 volume group;

22 computer readable program code which, if said current base logical volume is
23 assigned to the (j)th logical volume group, causes said programmable computer processor
24 to permit said requesting host to access said current base logical volume;

25 computer readable program code which, if said current base logical volume is not
26 assigned to the (j)th logical volume group, causes said programmable computer processor
27 to disallow access to said current base logical volume.

1 22. The computer program product of claim 21, wherein a first person owns
2 said requesting host computer, and wherein a second person owns said article of
3 manufacture.

1 23. The computer program product of claim 21, further comprising:
2 computer readable program code which causes said programmable computer
3 processor to receive a request to reassign said alias to a different one of said plurality of
4 logical volumes;
5 computer readable program code which causes said programmable computer
6 processor to determine if said different logical volume and said original base logical
7 volume are assigned to the same logical volume group;
8 computer readable program code which, if said different logical volume and said
9 original base logical volume are assigned to the same logical volume group, causes said
10 programmable computer processor to reassign said alias to said different base logical
11 volume;
12 computer readable program code which, if said different logical volume and said
13 original base logical volume are not assigned to the same logical volume group, causes
14 said programmable computer processor to deny the request to assign the alias.

1 24. The computer program product of claim 21, further comprising:
2 computer readable program code which causes said programmable computer
3 processor to receive a request to delete said alias;
4 computer readable program code which causes said programmable computer
5 processor to delete said alias.

1 25. The computer program product of claim 21, further comprising:
2 computer readable program code which causes said programmable computer
3 processor to receive a request to assign said original base logical volume;
4 computer readable program code which causes said programmable computer
5 processor to determine if the current base logical volume associated with said parallel
6 access volume differs from said original base logical volume;
7 computer readable program code which, if the current base logical volume does
8 not differ from said original base logical volume, causes said programmable computer
9 processor to assign said original base volume;
10 computer readable program code which, if the current base logical volume differs
11 from said original base logical volume, causes said programmable computer processor to
12 change the current base logical volume to said original base logical volume, and assign
13 said original base logical volume.

1 26. The computer program product of claim 21, further comprising:
2 computer readable program code which causes said programmable computer
3 processor to receive a request to unassign the original base logical volume;
4 computer readable program code which causes said programmable computer
5 processor to determine if the current base logical volume associated with said parallel
6 access volume differs from the original base logical volume;
7 computer readable program code which, if the current base logical volume does
8 not differ from the original base logical volume, causes said programmable computer
9 processor to unassign the original base volume;

10 computer readable program code which, if the current base logical volume differs
11 from the original base logical volume, causes said programmable computer processor to
12 change the current base logical volume to the original base logical volume, and unassign
13 said original base logical volume.

1 27. The computer program product of claim 21, further comprising:
2 computer readable program code which causes said programmable computer
3 processor to receive a request to delete said original base logical volume;
4 computer readable program code which causes said programmable computer
5 processor to delete said alias and said original base logical volume.

1 28. The computer program product of claim 21, further comprising:
2 computer readable program code which causes said programmable computer
3 processor to receive a request to assign the current base logical volume associated with
4 said parallel access volume;
5 computer readable program code which causes said programmable computer
6 processor to determine if the current base logical volume differs from the original base
7 logical volume;
8 computer readable program code which, if the current base logical volume does
9 not differ from the original base logical volume, causes said programmable computer
10 processor to assign the current base logical volume;
11 computer readable program code which, if the current base logical volume differs
12 from the original base logical volume, causes said programmable computer processor to

13 reassign said alias to said original base logical volume, and assign said current base
14 logical volume.

1 29. The computer program product of claim 21, further comprising:
2 computer readable program code which causes said programmable computer
3 processor to receive a request to unassign the current base logical volume associated with
4 said parallel access volume;
5 computer readable program code which causes said programmable computer
6 processor to determine if the current base logical volume differs from the original base
7 logical volume;
8 computer readable program code which, if the current base logical volume does
9 not differ from the original base logical volume, causes said programmable computer
10 processor to unassign the current base logical volume;
11 computer readable program code which, if the current base logical volume differs
12 from the original base logical volume, causes said programmable computer processor to
13 reassign said alias to said original base logical volume, and unassign the current base
14 logical volume.

1 30. The computer program product of claim 31, further comprising t:
2 computer readable program code which causes said programmable computer
3 processor to receive a request to delete the current base logical volume associated with
4 said parallel access volume differs;

5 computer readable program code which causes said programmable computer
6 processor to determine if the current base logical volume differs from the original base
7 logical volume;

8 computer readable program code which, if the current base logical volume does
9 not differ from the original base logical volume, causes said programmable computer
10 processor to delete the current base logical volume;

11 computer readable program code which, if the current base logical volume differs
12 from the original base logical volume, causes said programmable computer processor to
13 reassign said alias to said original base logical volume, delete the current base logical
14 volume.